

Space-Qualified 1064 nm Seed and Metrology Laser, Phase I

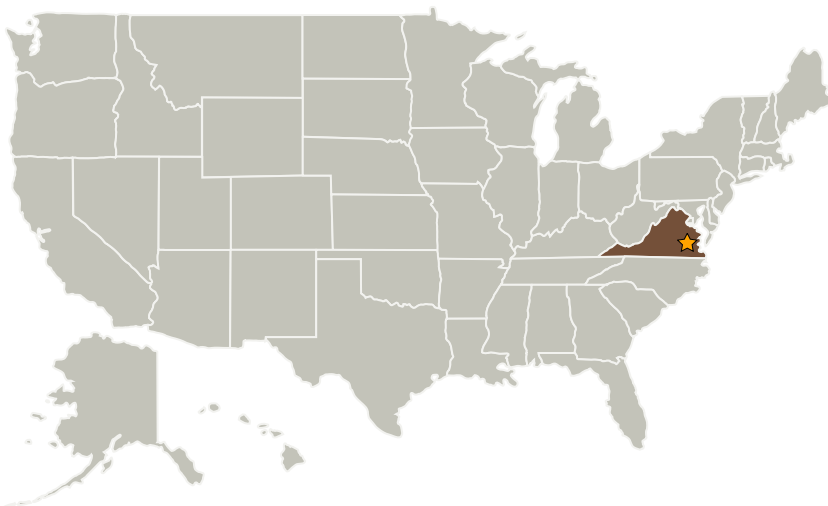
Completed Technology Project (2004 - 2004)



Project Introduction

A space-qualified, single-frequency oscillator operating at 1064 nm is a critical component for a number of active optical measurement systems that have been proposed for both ground and space-based NASA missions. These include metrology for space-based interferometers, direct detection wind lidar systems, atmospheric aerosol measurement systems, and differential absorption lidar (DIAL) systems for ozone measurement. These applications all require a frequency-stabilized cw 1064 nm oscillator with an output power in the 10-100 mW range. We propose to design and build a space-qualified version of the required laser oscillator. We will base our design on a diode-pumped microchip laser. It will incorporate both active temperature control and locking to a narrow molecular absorption to provide a high level of frequency stabilization. Redundant diode pumps, thermally and mechanically robust packing, and a careful choice of materials to minimize contamination effects will ensure the design will be space qualifiable. Our Phase I work will demonstrate that the key technology goals can be met in a space qualifiable design. In Phase II we will accomplish the detailed design, assembly, and qualification of a space-qualified single frequency laser that meets the required performance goals.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Langley Research Center (LaRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Langley Research Center (LaRC)	Lead Organization	NASA Center	Hampton, Virginia
Metis Technology Solutions, Inc.	Supporting Organization	Industry Women-Owned Small Business (WOSB)	Albuquerque, New Mexico

Primary U.S. Work Locations

Virginia

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Floyd Hovis

Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.1 Remote Sensing Instruments/Sensors
 - └ TX08.1.5 Lasers